

SEMICONDUCTOR LASER

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Abstract

PURPOSE: To obtain a semiconductor laser composed of a direct transition type superlattice active layer and a clad layer having almost complete lattice matching for the active layer, by providing a double hetero junction wherein an active layer is constituted of a superlattice layer formed by alternately laminating III-V compound of direct transition type and that of indirect transition type, and a clad layer is constituted of III-V compound which has macroscopically almost the same composition as the superlattice layer.

CONSTITUTION: A clad layer 2 of $N^{+}\text{-GaAs}_{0.52}\text{P}_{0.49}$ is epitaxially grown on an $N^{+}\text{-GaAs}$ substrate 1 by a usual vapor growth method. The layer is a carrier confinement layer, and at the same time a buffer layer for growing a desired superlattice layer on the GaAs substrate. By ALE or MOCVD, one-atomic layers of GaAs and one-atomic layers of GaP are alternately grown, and a superlattice layer 3 is formed, on which a clad layer 4 of $P^{+}\text{-GaAs}_{0.52}\text{P}_{0.48}$ is grown by an ordinary vapor growth method. Said layer is a carrier confinement layer, and a contact layer for forming an electrode is formed on the uppermost surface. By mesa etching, the width of the active region is limited to be a specified value. After a buried layer 5 being a current blocking region is formed by liquid growth, electrodes 6 and 7 are formed, thereby completing a superlattice semiconductor laser.